

High Performance Circulator Pump



What is this Technology?

Circulator pumps move fluid through closed-loop heating and cooling systems to regulate air temperature. Currently, most small circulator pumps (< 2.5 hp) operate at a constant speed and are oversized to accommodate for worst-case conditions. The ability to incrementally adjust a pump's flow speed to a building's changing demands conveys a significant opportunity to conserve energy. The high-performance circulator technology under consideration represents a significant improvement over costly and complex variable frequency drives (VFD) by electronically controlling motor speed with permanent magnet and compact stator motor technology. The variable-speed electronically-commutated motor (ECM) is governed by onboard algorithms, including a self-optimizing mode that finds the most efficient flow speed under different conditions. The device also tracks and records temperature, flow rate, and energy use, providing operators with records and immediate feedback. Whereas an equivalent setup would require piecing together separate pumps, meters, and communication equipment that could introduce compatibility problems, this integrated device is relatively easy to attach to an existing system. It can be controlled through a building automation system (BAS) or independently via the pump head, desktop application, or handheld devices.

Why is GSA Interested?

By combining an estimated typical energy savings of 40% with variable flow and "smart" features such as self-optimization, remote operation, metering, and reporting, this simple-to-deploy device raises the possibility of simultaneously saving energy, generating useful data, and preserving building occupant comfort. The technology promises to be an affordable and easily deployable alternative to the purchase and installation of add-on VFDs that are more expensive and less efficient.



ENERGY EFFICIENCY The manufacturer estimates typical pump energy savings of 40%.



COST-EFFECTIVENESS Payback is estimated to be less than five years with a 15-year technology lifespan.



OPERATIONS & MAINTENANCE The technology uses a wet rotor design where the water is in constant contact with the pump and is seal-less and oil-less so no maintenance is required. Remote management enables warning and alarms to be sent directly to a mobile phone or desktop computer.



DEPLOYMENT POTENTIAL The manufacturer claims that the technology can replace pumps up to 5 hp in size. This technology is suitable for all domestic hot water applications as well as heating, cooling, and ground source heat pump systems.

The Green Proving Ground program, in association with a federal laboratory, is subjecting high performance circulator pumps to real-world measurement and verification in GSA buildings. Results will be published on the GPG website, www.gsa.gov/gpg.



The Green Proving Ground program leverages GSA's real estate portfolio to test innovative building technologies. The program helps GSA meet its sustainability goals by providing actionable data that informs investment decisions targeted at energy-use reduction.